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ABSTRACT

The objective of the inquiry was to develop a psychological instrument for use in assessing the attitudes held by secondary school and college students. For reliability purposes, it was deemed that a minimum of 30 or more semantic scales, used as individual items would be essential. A seven position ordinal scale was interposed between each pair of bipolar adjectives forming the 25 semantic scales. A total of 610 student records were used in the standardization process, 287 were high school students, 323 were college students. All semantic scales were subjected to an item analysis, and only those items were retained which correlated .20 or better, with the total score for all three concepts: (1) what I learned in this class; (2) the teacher of this class; and (3) me as a student. Each of the 35 scales were assigned values ranging from one to seven for the seven adjective positions on the interposed ordinal scales. Little difference was obtained among the reliabilities for the three variations of the Kuder-Richardson Formula 20. The Likert technique was used to compute three part scores, with the three part scores being the total score on the test. The intercorrelations of scores on the test were computed separately for pre- and post-course administration. [Not available in hard copy due to marginal legibility of original document.] (SJ)

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DEVELOPMENT OF A SEMANTIC DIFFERENTIAL TO ASSESS THE ATTITUDE OF SECONDARY SCHOOL AND COLLEGE STUDENTS

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The objective of the inquiry was to develop a psychological instrument for use in assessing the attitude of secondary school and college students. It sought to establish semantic scales for use in a semantic differential on the basis of rigid adherence to usual test development and standardization procedures (Nunnally, 1967), to use adjectives for the development of semantic scales that proved to be critical in previous studies, to use Likert type scoring of the semantic differential with part scores for separate "concepts", and to validate against meaningful criterion variables.

Development of Semantic Differential

In as much as the reliability of a psychological instrument is in large part a function of the number of items contained as a "sample of behavior" of criteria being assessed, it was deemed that a minimum of 30 or more semantic scales, used as individual items, would be essential.

Development of Semantic Scales

Each semantic scale was comprised of a rating scale anchored by bipolar adjectives, and as traditionally used for the semantic differential (Osgood, et.al., 1957).

Selecting the bipolar adjectives. The Adjective Check List by Gough and Heilbrun (1965) has been used extensively in connection with the identification and evaluation of adjectives for their criticalness

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in relation to human behavior. Accordingly, 20 of the 35 semantic scales used in the final standardized Semantic Differential for Secondary Students (S-D) were developed from adjectives suggested in studies as being critical by studies using referenced The Adjective Check List. Ten of these adjectives were reported by Applezweig (1960) in a study involving 360 entering students at Connecticut College for Women. Five of these adjectives were selected by freshmen women with superior grades at the end of the first semester, all of whom were on the Dean's list, and with opposite adjectives are as follows:

practical - imaginative
thorough - partial
logical - illogical
sympathetic - unsympathetic
appreciative - unappreciative

The other five adjectives were selected by freshmen women with inferior grades at the end of the first semester, all of whom were on probation, and with opposite adjectives are as follows:

affectionate - hateful
forgiving - unforgiving
frank - deceitful
loyal - disloyal
tolerant - intolerant

Ten more of the adjectives were reported in The Adjective Check List Manual (Gough and Heilbrun, 1965)for a study of 295 males, with six coming from those having high scores on the "Mathematician Scale" of Strong Vocational Interest Blank, and four from those having low scores:

High Scores	Low Scores
civilized - uncivilized	lazy - ambitious
curious - indifferent	narrow interest - broad interest
insightful - blind	shallow - deep

High Scores (Cont-)	Low Scores (Cont-)
original - imitational	simple - complex
rational - irrational	
sensitive - insensitive	

The remaining 15 semantic scales were taken from studies that clearly indicated the factorial identity of each (Osgood, et.al., 1957; Nunnally, 1967; and McNeil, 1968):

Evaluative Factor	Activity Factor
wise - foolish	active - passive
successful - unsuccessful	excitable - calm
valuable - worthless	inhibited - uninhibited
honest - dishonest	
interesting - boring	
pessimistic - optimistic	

Familiarity Factor	Potency Factor
clear - vague	strong - weak
usual - unusual	fast - slow
disorderly - orderly	
conservative - progressive	

Scale used for rating purposes. A seven position ordinal scale was interposed between each pair of bipolar adjectives forming the 35 semantic scales. The seven positions on each scale were defined as follows: (1) extremely, (2) moderately, (3) slightly, (4) neutral, (5) slightly, (6) moderately, and (7) extremely. The subject is asked to rate a concept on the seven point scale in terms of which of the two bipolar adjectives is believed to be most appropriate, and in terms of the four adjective positions adjacent to such word.

Concepts Used

Three different concepts were used in the standardization of The Semantic Differential for Secondary School Students (S-D):

.. What I learned in this class.
.. The teacher of this class.
.. Me as a student.

Each one of the three different concepts made use of the same 35 semantic scales described.

Standardization

Six hundred and ten student records were used in the standardization process. About half of them,287, were from high school students; while the remainder, 323, were from upper-division college students or graduate students.

Item Retention and Revision

All semantic scales were subjected to an item analysis, and only those items were retained that correlated .20 or better with the total score for all three concepts. Three separate revisions were necessary before reasonable stability was established, and where an r of .20 or better was established for two of the three concepts utilized,i.e., (1) What I learned in this class, (2) The teacher of this class, and (3) Me as a student.

Assigning Weights to Semantic Scales

Each of the 35 semantic scales were assigned values ranging from 1 to 7 for the seven adjective positions on the interposed ordinal scales. The initial step in the weighting involved identifying those adjective pairs where one of the adjectives seemed clearly to be desired to the other, and the value of 7 was assigned to the side of the semantic scale with that adjective, with the 1 being assigned to the other,i.e., practical, thorough, logical, appreciative, honest, loyal, and the like. A statistical technique was then used to determine on which side the value of 7 was to be assigned on the semantic scales where it seemed questionable which adjective of the bipolar pairs was to be desired,i.e., original, active, excitable, narrow interest, conservative, fast, tolerant, etc. (Torgerson, 1962).

Reliability

Data contained in Table 1 illustrates internal consistency type of reliability for each of the three part and the total scores by use of the traditional Kuder-Richardson (K-R) Formula 20. The part scores range from an r of .421 for Part II - Learning to an r of .610 for Part III - Student. Total score reliabilities were computed for three different variations of the K-R 20 Formula, i.e., Traditional K-R 20 assumes all items have equal difficulty and correlations; Cronbach Alpha obtains correlation for all possible splits of the test; while Horst corrects for dispersion of item difficulty. When there is little dispersion of item difficulty, there is little difference among the r's obtained for the three variations of the K-R Formula 20. Since the r obtained for the Horst variation of the K-R Formula 20 is considerably larger than for the traditional K-R 20 and the Cronbach Alpha, it is obvious that there was considerable dispersion of item difficulty in the study.

Scoring of S-D

Three part scores were computed based on the Likert technique (Likert, 1932). Each semantic scale (test item) received a weight from 1 to 7, with the 7 value being assigned to the right side when a single asterisk follows the scale, and on the left when two asterisks follow the scale as shown in Figure 2. The same 35 semantic scales were used for all three concepts, with each concept representing a part score, and with the sum of the three part scores being the total score on the S-D:

.. Part I - Teacher: (rating for "The Teacher of this class"),

.. Part II - Learning: (rating for "What I learned in this class"),

.. Part III - Student: (rating for "Me as a student"), and

.. Total S-D Score: sum of the three separate scores.

Intercorrelations of S-D Scores

The intercorrelations of scores on the S-D were computed separately for pre-and post course administration, and as illustrated in Tables 2 and 3 respectively. The means and standard deviations for the pre- and post-course administration of the S-D were also included. The shift in change of correlation coefficients is in a direction of greater common variance between the student and both the teacher and learning, and with the greatest shift being towards embracing values of teacher, i.e., from an r of .504 to an r of .707. In comparing the means for the pre-course S-D administration from Table 2, with the post-course means in Table 3, it can be seen that the greatest change takes place with student, as opposed to the teacher and learning.

Criterion Study

Two faculty members were involved from the Educational Psychology Department at the University of Wisconsin-Milwaukee, an assistant professor and a full professor. There were 243 students asked to score the S-D at the beginning of the semester, but only 237 of the same students completed it at the end. An analysis of variance for correlated observations was accomplished to determine if there was a significant change in the attitude of students as measured by the S-D for the three concepts included. The data illustrating the findings of that test are contained in Table 4. The only statistically significant change indicated in Table 4 is for Part Score III - Student, and which deals with the student's own opinion of himself as a student. The change is in a direction of greater esteem for self, with little or no significant change in either the teacher or what he though he learned during the particular course involved. Based on this finding, students appear to feel they have changed for the better as a result of the courses, but the basis of that change does not appear to involve a change in attitude

towards either the teacher or what they have learned.

Factor Analysis

Two separate principal component factor analyses were accomplished involving the 105 semantic scales (items on the S-D) as variables, and for the entire 610 subjects involved in the initial standardization process. The data for these two analyses are not included, as they are too voluminous, and contribute little to the findings. The first of the two analyses extracted 12 separate factors with one eigen value or more, with the first factor accounting for 60 per cent of the total variance, and all 12 factors accounting for 93 per cent. When these 12 factors were rotated to simple structure by use of the varimax orthogonal method, four factors under each of the three concepts were obviously in agreement with the Osgood factor content of semantic scales initially included: I-Evaluative, II-Activity, III-Familiarity, and IV-Potency.

The second factor analysis was done with the same data, and in the same manner, except that only three factors were extracted. This was done to determine if the factorial content for the three concepts (teacher, learning, and student)was more potent than the factor identification of the semantic scales. The first of the three factors accounted for 60 per cent of the total variance, but all three of the factors only accounted for 70 per cent of the variance. Interaction of the semantic scales and concepts seem to follow the pattern described by Nunnally (1967) and others, where the loadings for the concepts are more factorially potent than for the semantic scales.

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TABLE 1

Internal Consistency Reliability

(N=610)

Variation of K-R 20	Part I Teacher	Part II Learning	Part III Student	Total S-D Score
Traditional K-R 20:	.534	.421	.610	.92°
Cronbach's K-R 20				.929
Horst's K-R 20				.960

TABLE 2

Intercorrelations of Pre-course S-D Scores

(N=243)

Scores on S-D	Part I Teacher	Part II Learning	Part III Student	Total S-D Score
Part I - Teacher		.53°	.584	.°76
Part II - Learning			.530	.°07
Part III - Student				.°0°
Total S-D Score				
Mean	101.°1	173.76	166.69	532.25
Standard Deviation	24.73	2°.06	1°.°°	63.07

TABLE 3

Intercorrelations of Post-Course S-D Scores

(N=237)

Scores on S-D	Part I Teacher	Part II Learning	Part III Student	Total S-D Score
Part I - Teacher		.687	.707	.943
Part II - Learning			.620	.912
Part III - Student				.879
Total S-D Score				
Mean	194.30	174.94	187.38	557.02
Standard Deviation	21.53	22.09	20.73	62.33

THE SEMANTIC DIFFERENTIAL FOR SECONDARY SCHOOL STUDENTS (S-D)

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This SEMANTIC DIFFERENTIAL is intended for use in assessing the attitude of persons in relation to certain concepts related to learning. It consists of 35 Semantic Scales (adjective antonyms) which are related to effectiveness in student learning; both at the secondary and college levels of instruction. The three important concepts which have been used in the preliminary validation of this instrument are: (1)TEACHER, (2)LEARNING, and (3) STUDENT. Any number of other pertinent concepts may be used with the same 35 Semantic Scales contained in this instrument.

****

Name_____ _____School_____

Teacher_____Class_____Date_____

Sex M F (Circle one) Age_____ _____ _____

General Directions:

Each of the following pages contains a 'concept' at the top which is believed to be related to how well you have learned, and with 35 different pairs of opposite adjectives, which are called 'Semantic Scales'. The concept is different for each page, but the 35 adjective pairs are the same. You are to mark each of the 35 adjective pairs, which we will refer to as 'Semantic Scales', in relation to how you actually feel about the concept at the top of the page. The concept at the top of the first page is "WHAT I LEARNED IN THIS CLASS", and we have used this concept in the Example that follows:

Example: WHAT I LEARNED IN THIS CLASS

	Ex-tremely	Moder-ately	Slight-ly	Neut-ral	Slight-ly	Moder-ately	Ex-tremely	
1. Strange	____:	____:	____:	____:	____:	____:	____:	Familiar
2. Ugly	____:	____:	____:	____:	____:	____:	____:	Beautiful
3. Easy	____:	____:	____:	____:	____:	____:	____:	Hard

If you think that "HOW WELL YOU LEARNED IN THIS CLASS" was strange, make an "X" near the word strange; but if you think it was more familiar, mark the "X" near the word familiar. The example with the "X" right next tc strange indicates that the student thought WHAT HE LEARNED IN THIS CLASS was strange. The "X" right next to beautiful suggests that he felt WHAT HE LEARNED IN THIS CLASS was beautiful. For the "Easy-Hard" Semantic Scale (adjective antonyms the "X" is placed right in the middle of the scale, or about half-way between easy and hard. This is a neutral position indicating that the student felt that WHAT HE LEARNED IN THIS CLASS was neither easy nor hard. It was probably some of each; so he placed the "X" in the middle of the Semantic Scale for that concept.

Remember each page contains a new and different concept, but the same 35 Semantic Scales are used. You are to mark each of the 35 Semantic Scales for all of the concepts included. When you are finished, turn the booklet face-down.

Figure 1. S-D General Instructions

WHAT I LEARNED IN THIS CLASS

	Extremely	Moderately	Slightly	Neutral	Slightly	Moderately	Extremely	
1.	practical							Imaginative*
2.	thorough							partial**
3.	logical							illogical**
4.	sympathetic							unsympathetic**
5.	clear							vague**
6.	appreciative							unappreciative**
7.	civilized							uncivilized**
8.	curious							indifferent**
9.	insightful							blind**
10.	original							imitational**
11.	rational							irrational**
12.	sensitive							insensitive**
13.	wise							foolish**
14.	interesting							boring**
15.	successful							unsuccessful**
16.	strong							weak**
17.	active							passive**
18.	fast							slow**
19.	usual							unusual*
20.	valuable							worthless**
21.	excitable							calm**
22.	honest							dishonest**
23.	affectionate							hateful**
24.	forgiving							unforgiving**
25.	frank							deceitful**
26.	loyal							disloyal**
27.	tolerant							intolerant**
28.	pessimistic							optimistic*
29.	lazy							ambitious*
30.	narrow interest							broad interest*
31.	shallow							deep*
32.	simple							complex*
33.	conservative							progressive*
34.	inhibited							uninhibited**
35.	disorderly							orderly*

Figure 2. Semantic Differential for Secondary Students (S-D)